Friction

Name: _____ Section: 2AL-___ Date performed: __/__/__

Lab station: ____ Partners: _____

Testing Rule I

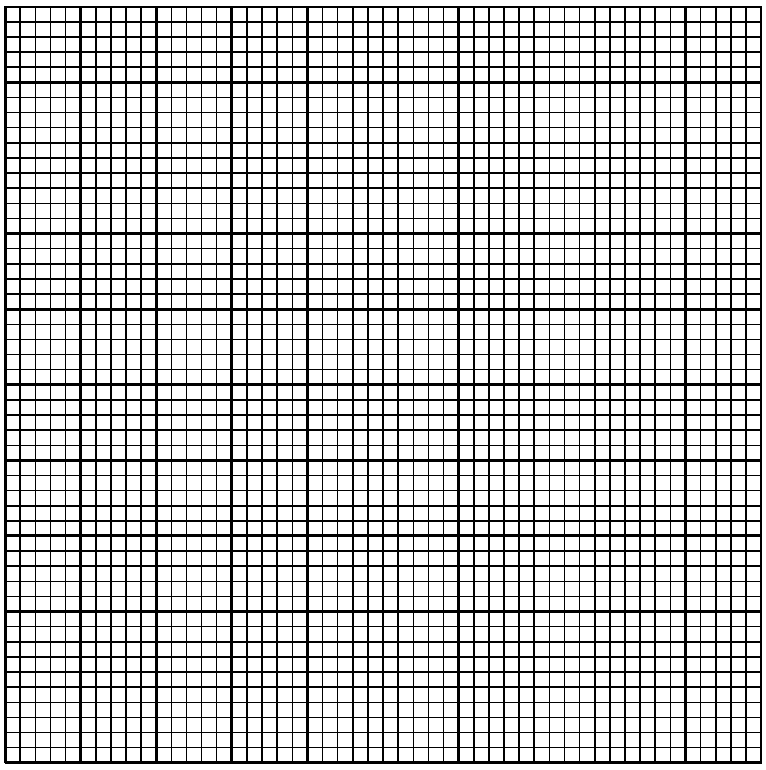
(Q-1,2) Measure f_s and f_k for various normal forces.

Weight of the block = _____ gwt

Added weight (gwt)	Normal force (gwt)	Static friction (gwt)					Average f_s (gwt)
0							
100							
200							
300							
400							
500							
600							

Added weight (gwt)	Normal force (gwt)	Kinetic friction (gwt)					Average f_k (gwt)
0							
100							
200							
300							
400							
500							
600							

(Q-3) Plot f_s and f_k on the same graph as a function of N.



(Q-4) Compute the coefficients of friction μ_s and μ_k.

$\mu_s =$ _____ $\mu_k =$ _____

What are the SI units of μ_s and μ_k?

Is Rule I supported by your data? Explain.

Testing Rule II

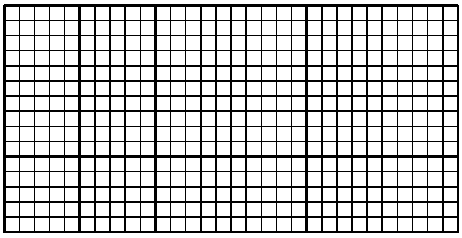
(Q-5,6) Measure f_s and f_k for each side of the block.

$x =$ _____ cm $\quad y =$ _____ cm $\quad z =$ _____ cm

Normal force (same in all cases) = _____ gwt

	Area (cm^2)	Static friction (gwt)			Kinetic friction (gwt)		
Large side							
Narrow side							
End							

(Q-7) Plot f_s and f_k on the same graph as a function of area. Plot each individual data point.



(Q-8) Is Rule II supported by your data? Explain.

Testing Rule III

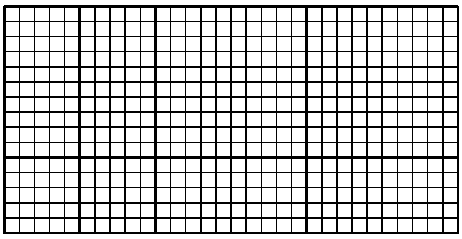
(Q-9) Measure f_k for four different speeds.

Normal force (same in all cases) = _____ gwt

Speed (cm/s)	Kinetic friction (gwt)		
25			
17			
10			
5			

Why doesn't Rule III apply to static friction?

(Q-10) Plot f_k as a function of speed. Plot each individual data point.



(Q-11) Is Rule III supported by your data? Explain.

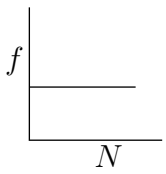
Examine Rule IV in the lab text. Can you draw any conclusions regarding this rule from the experiments you have performed in this lab? Explain.

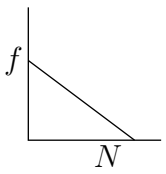
Exercises

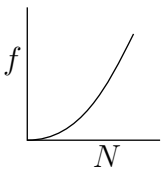
How did you determine the normal force in testing Rule I?

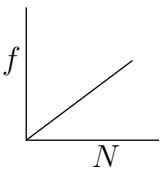
(A) By direct measurement.
(B) Normal force equals the weight of the block.
(C) Normal force equals the amount of weight added on top of the block.
(D) Normal force equals the sum of the block's weight and the added weight.
(E) Normal force equals the sum of the friction force and the added weight.

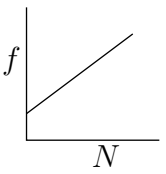
Which of the following graphs would show Rule I to be correct?

(A) 

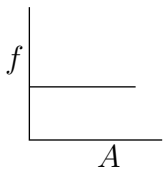
(B) 

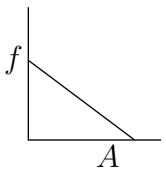
(C) 

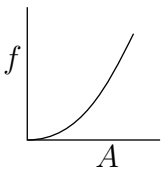
(D) 

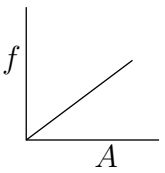
(E) 

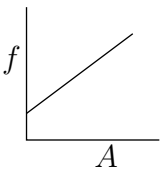
Which of the following graphs would show Rule II to be correct?

(A) 

(B) 

(C) 

(D) 

(E) 

Which of the following applies in testing Rule II?

(A) The normal force should be kept constant while the area is changed.
(B) The area should be kept constant while the normal force is changed.
(C) Both the normal force and the area should be kept constant.
(D) Both the normal force and the area should be changed.

In testing Rule III, why can we get away with making a crude estimate of the speed of the block?

Suppose we push the block across the paper with some initial velocity and observe that the block slows down to rest with constant acceleration after we let go of it. Which rule would this observation support?

(A) Rule I.
(B) Rule II.
(C) Rule III.
(D) None of the rules is supported by this observation.

Explain: